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THE

JOHN MURRAY EXPEDITION 1933–34

SCIENTIFIC REPORTS

VOLUME VIII, No. 2

STYLASTERIDÆ (HYDROCORALS) OF THE JOHN MURRAY EXPEDITION TO THE INDIAN OCEAN

BY

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Professor at the University of Oslo.

WITH ONE PLATE AND FOUR TEXT-FIGURES

LONDON:
PRINTED BY ORDER OF THE TRUSTEES OF THE BRITISH MUSEUM
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B. QUARITCH, LTD., 11 GRAFTON STREET, NEW BOND STREET, LONDON, W. 1; OXFORD UNIVERSITY PRESS, WARWICK SQUARE, LONDON, E.C. 4; H.M. STATIONERY OFFICE, LONDON, S.W. 1
AND AT
THE BRITISH MUSEUM (NATURAL HISTORY), CROMWELL ROAD, LONDON, S.W. 7
1947

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Price Two Shillings and Sixpence

[*Issued 20th March*, 1947]

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ALTHOUGH the John Murray Expedition only brought home a very small collection of Stylasteridæ from the Indian Ocean, the observations present features of considerable interest. Geographically a couple of new localities have been added to our scanty knowledge of the western parts of the Indian Ocean, and although only four species have been dredged, no less than three of them are new to science.

The following species have been collected :

Stylaster (Eu-Stylaster) ramosus n. sp., 73–165 m.
Stylaster (Eu-Stylaster) lonchitis n. sp., 113 m.
Crypthelia stenopoma Hickson and England, 1905, 229 m.
Crypthelia clausa n. sp., 609–915 m.

Neither in the Pemba Canal nor at the Maldives have Stylasteridæ been found previously, and, moreover, the reported localities of the John Murray Expedition are at the present day the most northern localities of the western Indian Ocean from which Stylasteridæ have as yet been reported.

Whereas the two **Stylaster** species from the Pemba Canal have been collected in that zone of the bathymetrical region, where the genus is known to be comparatively abundant in all seas, the localities of **Crypthelia** at the Maldives belong to the uppermost parts of its habitat, and its occurrence in these depths seems to be very scanty. The depth of 229 metres (St. 157) is altogether the shallowest record of the genus at present, and the find is the more surprising because the species which has been found at such a relatively shallow depth, **Crypthelia stenopoma**, has hitherto only been taken in 1300 metres or deeper in the Indo-Malayan Seas. Moreover, this species must evidently be comparatively abundant at the Maldives, several colonies having been brought home from the two stations 152 and 157.

It is very surprising that none of the present species coincide with those reported from the Percy Sladen Trust Expedition to the Indian Ocean (Hickson and England, 1908), which operated in adjacent waters, and the only previously known species, viz. **Crypthelia stenopoma**, has hitherto only been found by the " Siboga " Expedition in the eastern parts of the Indo-Malayan area. This illustrates how scanty our knowledge of the bottom fauna of the Indian Ocean, in fact, is, and it also gives support to the statement in an earlier paper (Broch, 1942) that most species of the Stylasteridæ have a comparatively limited occurrence. Nevertheless, many new localities of Stylasteridæ will probably turn up by-and-by also in the western Indian Ocean, although the occurrence of this (animal) group on the whole is scanty and is confined to special conditions of the sea bottom, which only too often present a severe obstacle to dredging operations in general. In this connection it is of interest to keep in mind that the rich Stylasterid fauna of the waters near Mauritius and South Africa has only quite recently been revealed by the dredging operations of the Danish zoologist, Dr. Th. Mortensen (see Broch, 1936, 1942). It is improbable that Stylasteridæ should be entirely absent in the Red Sea, the Persian Gulf and in the adjacent parts of the Indian Ocean, from which areas as yet no findings have been recorded.

Genus **STYLASTER.**

Two representatives of the **Eu-Stylaster** group are present in the collections. They distinguish themselves at once from the **eximius**-group by their low numbers of dactylopores in the cyclosystems, in spite of many points of resemblance in other respects. **Stylaster eximius**, however, has generally from 12 to 14 dactylopores in the cyclosystems (comp. Broch, 1936), whereas the dactylopores of the two present species commonly only amount to 7 to 11, as the tables show. It is surprising to find this conformity between the two species, which otherwise are rather different. Both show the lowest numbers known among the **Eu-Stylaster** species, and it is only the Japanese species, **Stylaster dentatus** Broch, which has a correspondingly low number of dactylopores ; but this species differs markedly in all other respects.

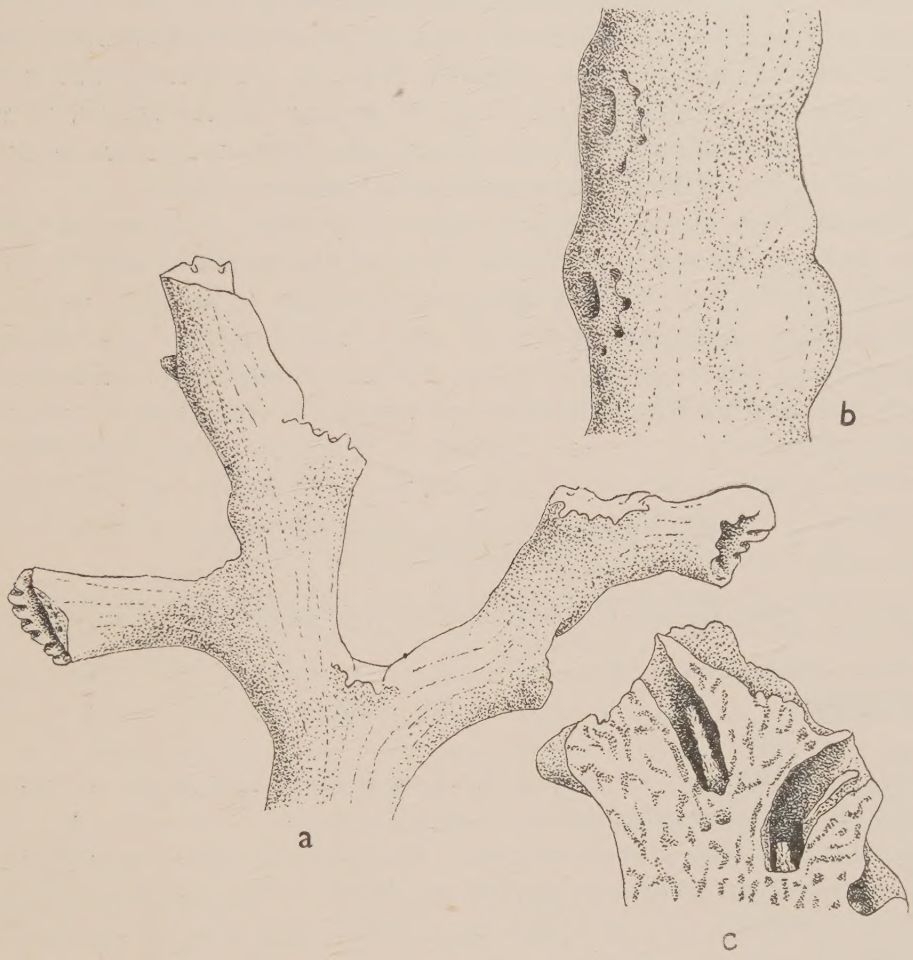
Stylaster (Eu-Stylaster) ramosus n. sp.

St. 111, Pemba Channel, 73–165 m. Several colony fragments up to 42 mm. high.
St. 112, Pemba Channel, 113 m. Very many colony fragments; the largest fragment is 52 mm. high, with a breadth of 48 mm.

The species is reprsented in the collections by a great number of rather large colony fragments, but only a couple of evidently intact colonies are present. The present material seems to indicate that the colonies generally are rather small.

The colonies (Plate I, fig. 1, *a*, *b*) are usually flabellate and very irregularly branched ; in most cases no branch or branchlet diverges from the main plane of the fan. However, two small and evidently intact colonies exhibit an aberrant appearance, as their ramification does not confine itself to one main plane. This is especially obvious in the smallest of the colonies, which is seated on the dead axis of an Antipatharian. The " basal part " of the **Stylaster** covers the Antipatharian axis for some length, and from this incrusting part branchlets and secondarily ramified branches arise in all directions, giving the entire

colony a thoroughly irregular, bushy appearance. Also in a couple of the fragments one branch or other diverges strongly from the main plane of the fan. Although the species, as a whole, must be characterized as fan-shaped, the colonies are, accordingly, not so strictly confined to one plane in their ramification as in many other species of the **Eu-Stylaster** group.



TEXT-FIG. 1.—**Stylaster (Eu-Stylaster) ramosus** n. sp. (*a*) Terminal part of a branchlet. (*b*) Part of a branchlet with ampullæ; on the right side three ampullæ are plainly visible. (*c*) Section exposing the gastrostyles in the gastropores; in the middle gastropore also the basal openings of the dactylopores are seen. (*a–c* × 25.)

In some cases the dimensions of the branchlets and branches are about equal and the colonies are very slender. In other cases, again, the main branches (or stems) are much thicker than the peripheral branchlets and the colonies are thus more robust. Slender colonies have single ampullæ scattered on the branches and branchlets. In some of the robust colonies, on the other hand, the branches and even some of the peripheral branchlets are swollen and inflated by the very numerous, crowded ampullæ; also in these cases the main branches and stems often exhibit comparatively large dimensions, although ampullæ do not occur here.

The species may in some cases be incrusting. This is observed in the basal parts of some of the fragments. The incrusting nature is in one case demonstrated by a seemingly rather robust " main stem " or " main branch," the central part of which consists of the black axis, about 1 mm. thick, of a Gorgonarian ; this axis is covered by a crust, about 1 mm. thick, formed by the **Stylaster**, and the entire " stem " thus attains a diameter of some 3 mm. The same diameter has also been reached in the stoutest branches of other fragments, where, however, no such foreign axis is present.

The surface of branches and branchlets is longitudinally feebly striped (Text-fig. 1, *a*, *b*). This striation is only observed under the lens, and is evidently mainly an optical phenomenon caused by very shallow and narrow furrows, in the bottom of which the numerous, slit-like apertures of the canal meshwork of the cœnosteum debouch. The colour of the colonies (in alcohol) is a pure white or yellowish white.

The *cyclosystems* are, almost without exception, complete. Only in one or two cases a cyclosystem near the summit of a branchlet has a small, cauline interval in the dactylopore circle. On the distal part of the branchlets the plane of the aperture of the cyclosystem forms an angle of some 60° with the axis of the branchlet. Proximally on the branches the aperture plane very soon approaches that of the branch surface, and at the same time the surrounding elevation of the cyclosystem is smoothed, so that the cyclosystems of the branches only present themselves as round gastropores surrounded by circlets of small, round dactylopores. The dactylotomes, which are well developed in young cyclosystems, become filled out in older cyclosystems and ultimately disappear. The diameter of the cyclosystem may amount to about 0·6 mm.

The number of dactylopores in the cyclosystem is illustrated by the following table :

Number of dactylopores in the cyclosystem	6.	7.	8.	9.	10.	11.	12.	13.	
Number of cyclosystems . .	2	11	28	27	18	11	2	1	100

The average number—8·94—is thus the lowest which has up to the present been recorded in the **Eu-Stylaster** group (comp. Broch, 1936).

The *gastropore* is seldom as deep as 1 mm. It is generally rather strongly and evenly arched, so that its gastrostyle is not visible from without. The gastrostyle (Text-fig. 1, *d*) is slender, needle-shaped, and, especially on its distal part, covered by small spicules, which, however, are not very bristling.

The *dactylopores* lack dactylostyles. In young cyclosystems distally on the branchlets the dactylopore is connected distally with the gastropore by a shallow, but distinct, dactylotome, which, however, is soon obliterated by growth of the cœnosteum. On the other hand, some of the dactylopores basally communicate with the gastropore through an opening in the gastropore wall near the basis of the gastrostyle, a peculiarity hitherto not found in any other **Stylaster.**

The *ampullæ* generally occur in crowded assemblies on smaller branches and branchlets, but not in main branches or stems. In a few cases they are observed singly and in small numbers in very slenderly built colonies. In these cases the ampulla protrudes on the surface of the branchlet almost like one half of a globe ; but in the common, crowded assemblies (Text-fig. 1, *b*) the ampullæ do not protrude so strongly, although this is probably due to a general inflation of the branchlet caused by the lively formation of gonophores. The surface of the ampullæ does not differ essentially from that of the

branches elsewhere in structure; at most the striation is a little less obvious on the ampulla roof.

The soft parts are lacking in the present colonies. Only in a few places remnants of a couple of ampullæ seem to indicate that the specimens are females.

The present species is evidently rather abundant in places, where its special demands are satisfied. The collections contain a great bulk of fragments from the stations 111 and 112, although no specimens have been dredged in other localities.

An investigation of the cœnosteum shows that this has a comparatively loose structure and a rather soft consistency; it is accordingly easily polished. The calcareous substance is also less translucent than in species with harder cœnosteum.

These features are in good accord with the tendency towards incrustation in the species. It is in this connection very interesting that one of the larger fragments in part has a tube-shaped stem, and that two smaller fragments have their stems built in just the same way as **Crypthelia stenopoma** and other Stylasteridæ, which commonly are inhabited by commensal Polychæts. **Stylaster ramosus** is thus evidently (at all events) a possible facultative host of worms. Also Cirripeds (**Pyrgoma**) commonly choose their abode in colonies of the present species (see Plate I, fig. 1, *b*), and also this seems to some degree to be in accordance with its tendency towards incrusting and the entire structure of its cœnosteum.

Stylaster (Eu-Stylaster) lonchitis n. sp.

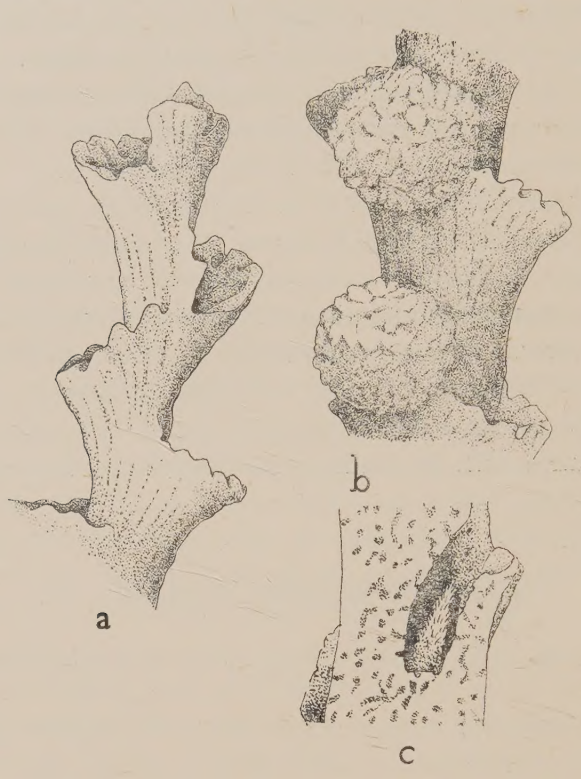
St. 112, Pemba Canal, 113 m. One colony and a few small fragments.

One colony of about 5 cm. height (Plate I, fig. 2) is present, together with some few small fragments. It is impossible to give exact measurements, the colony being very irregularly built; moreover, its basal part is covered by a sponge and carries worm-tubes and small crusts of Bryozoan colonies. One main branch is broken off near its origin and has the same diameter as the stem, which is up to 3 mm. thick. The ramification is scanty and wholly irregular, and the terminal branchlets are long, often more than 1 cm. without indications of side branchlets. Some of the fragments, however, indicate a more regular approximately subdichotomous branching in one plane, and it is likely that this is the normal feature of the species, although the terminal, undivided branchlets also in this case are remarkably long.

The colony is very slenderly built; the dimensions of branches and stem only increase very slowly as compared with the terminal branchlets. The surface of the cœnosteum is longitudinally rather distinctly striped, somewhat like the preceding species, owing to narrow and not very deep furrows, in the bottom of which slit-like openings of the canal meshwork are present. The colonies are (in alcohol) light salmon-pink in colour.

The *cyclosystems* are incomplete, and are horseshoe-shaped. Only in one or two cases terminal cyclosystems were observed, which are complete and circular, with no hint of a diastemma. In all other cases there is a broad, cauline interval in the circlet of dactylopores, and the width of this diastemma increases during growth, although the number of dactylopores seems to be constant in the cyclosystem. Only on the main branches the numbers of dactylopores sometimes evidently diminish during the last phase, when the pores by degrees are filled in and disappear because of the growth of the cœnosteum.

The diameter of the cyclosystems is rather variable. Radially to the branchlet the diameter is seldom as long as 0·6 mm., whereas the larger diameter, tangentially to the branchlet, may even slightly surpass 1 mm. and almost equals the diameter of the rather larger branchlets. The marginal part of the cyclosystem is feebly everted, and the width can accordingly even slightly surpass that of the thinner branchlets.



TEXT-FIG. 2.—**Stylaster (Eu-Stylaster) lonchitis** n. sp. from St. 112. (*a*) Terminal part of a branchlet. (*b*) Part of a branch showing two ampullæ. (*c*) Section through a gastropore exposing its gastrostyle. (*a–c* × 25.)

The number of dactylopores in the cyclosystems is illustrated by the following table :

Number of dactylopores in the cyclosystem . . .	7.	8.	9.	10.	11.	12.	
Number of cyclosystems	3	6	14	17	8	2	50

Although only 50 cyclosystems could be counted, the result is probably representative. The average number—9·54—is a little higher than in the preceding species, and coincides with that stated to be present in the species **Stylaster (Eu-Stylaster) dentatus** Broch from Japanese waters.

The *gastropore* is seldom more than 0·75 mm. deep, but its bottom is connected with somewhat wider canals of the cœnosteum meshwork, which seem to form a continuation of the gastropores, and which occupy the central part of the branchlet. Although the pore is only feebly arched (Text-fig. 2, *c*), the gastrostyle is generally not observed on external examination. The latter is rather robust, slenderly conical, and armed with small, bristling spicules on its distal two-thirds. The gastrostyle has throughout a delicate filigree build. On the basal parts of the gastrostyle wall warty protuberances are often

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observed, and in some cases they form a circlet giving the impression of a " basal chamber " in the gastropore.

The *dactylopores* are furnished with distinct dactylostyles. A shallow dactylotome distally connects the pore with the gastropore ; but there is no connection basally with the latter.

Ampullæ have only been found singly on the anterior or posterior side of the branchlets and branches. They are very prominent, and can even form a little more than one half of a globe above the surface of the branch. Remains of the soft parts contained in the ampullæ seem to indicate female specimens. The surface of the ampulla (Text-fig. 2, *c*) is strongly corrugated.

Remains of the soft parts could only be found in the ampullæ, and nothing could be stated as to the structure of gastrozooids and dactylozooids.

The cœnosteum of the present species consists of a comparatively hard calcareous substance, which is slightly more porcellaneous than in the preceding species. There was nothing to indicate that the present species is inclined to incrustation, and also nothing indicates that it affords abode to commensal animals of any kind.

Genus **CRYPTHELIA.**

Crypthelia stenopoma Hickson and England, 1905.

Hickson and England, 1905, Stylasterina of the " Siboga " Expedition, p. 24, pl. iii, figs. 30, 31 and 32.

St. 157, Maldive Islands, 229 m. Several dried, small colonies.

St. 152, Maldive Islands, 609–915 m. A large fragment of one colony and one old, corroded colony, together with **Crypthelia clausa**.

Several small colonies in the collections evidently belong to this species (a note added to the sample from Station 157 by Dr. Sydney J. Hickson also suggests that the specimens must probably be referred to **Crypthelia stenopoma**). There are, however, some small discrepancies as compared with the descriptions given by Hickson and England (1905), and especially the present, dried specimens do not exhibit the small nematophores mentioned by the above-named authors. This, however, may be due to the state of preservation, such details as nematophores being extremely difficult to detect when dried. However, no nematophores could be seen in the large fragment from Station 152, which is preserved in alcohol. This feature does not seem to be of great taxonomic importance.

Hickson and England say that " The surface is marked by pronounced longitudinal and fine transverse striations." A longitudinal striation is only obvious in the thinner branches, and depends upon shallow, somewhat irregular, longitudinal furrows in the bottom of which the peripheral radiating canals of the cœnosarcal meshwork debouch. There is, on the other hand, no trace of a transverse striation in the specimens. To this it may be added that the incrusting parts of the colonies and the ampulla roofs show no traces of striation at all, but exhibit a distinctly porous surface. Here the peripheral, radiating pores of the meshwork are a little dilated in their terminal portion at the surface, and much wider than elsewhere in the colonies.

Hickson and England characterize the species as " partially encrusting." This also holds good in the numerous small colonies of the present collections. However, another

feature is even more obvious, viz. the inflated state of the main stem. The colonies have a structure similar to that of **Stylaster gracilis** and the **Conopora** species that are inhabited by commensal Polychæts (comp. Broch, 1936). The main stem is strongly swollen and hollow, and in some cases it has developed leaf-like projections curving in over one (the posterior) side of the stem. In one case also the worm was present in the tube, and no doubt can exist that the peculiar construction of the stem is caused by the same

TEXT-FIG. 3.—**Crypthelia stenopoma** Hickson and England from St. 157. Branchlet with ampullæ at the bases of the two uppermost cyclosystems. (× 25.)

factors as in the other above-mentioned species that are inhabited by worms. It is thus probable that **Crypthelia stenopoma** also normally is inhabited by worms. The worm had dried up, but is evidently closely related to **Lagisca irritans** v. Marenzeller, which lives in **Stylaster (Stenohelia) macrogaster** v. Marenzeller and **Errina macrogastra** v. Marenzeller (see v. Marenzeller, 1904).

Crypthelia stenopoma (Text-fig. 3) is delicately built with small cyclosystems, the diameters of which only in very rare instances surpass 1·5 mm. The lid is small, in many cases almost rudimentary, and one might sometimes be tempted to refer smaller fragments to **Conopora**, as the lid is only indicated as a somewhat stronger " tooth " between two dactylotomes (see Text-fig. 3). The species exhibits on the whole evidence of a close relationship between **Conopora** and **Crypthelia.**

The number of dactylopores in the cyclosystems is shown in the following table :

Number of dactylopores in the cyclosystem	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	
Number of cyclosystems	1	1	2	3	5	12	20	23	20	9	4	—	100

The table shows that the numbers of dactylopores in the cyclosystems are rather great, and seem to coincide remarkably well with the numbers in **Crypthelia pudica** M.

Edwards and Haime (comp. Broch, 1936). The average number in **Crypthelia pudica** is 15·85 (only 40 systems have been counted), in **Crypthelia stenopoma** 15·56. Between these values **Conopora tenuis** Moseley comes in with 15·67 (128 cyclosystems), whereas **Conopora major** Hickson and England only has an average of 13·22 (72 cyclosystems). Also these numbers speak in favour of a " bridge " between the two genera from species of **Conopora**, where one or two of the (proximal) septæ or teeth between the dactylotomes are, in many cases, more strongly developed than the others, to **Crypthelia stenopoma** or allied species with very small lids, which in some cases might almost be regarded as merely excessively developed proximal teeth (or septæ).

The peripheral branchlets of **Crypthelia stenopoma** are very slender in comparison with the strongly inflated stem inhabited by the worm (Plate I, fig. 3, *a–d*), and such branchlets, which are not swollen owing to the development of ampullæ, exhibit an obvious, longitudinal striation, depending on shallow furrows in the bottom of which the apertures of the peripheral, radiating canals of the meshwork are seen as minute pores.

The cyclosystems are generally facing one way, the colonies in these cases exhibiting a pronounced anterior side. We get the impression in these cases that the worm originally has chosen its abode on the posterior side of the stem, which has accordingly developed lateral protecting leaflets curving in over the posterior side. These leaves coalesce to build a somewhat thinner roof over the " tube " of the worm. Secondarily, cyclosystems can also now develop on the posterior side of this roof, and now and again also branchlets can develop in varying numbers with cyclosystems facing the posterior side of the colony. In extreme cases it is very difficult, if at all possible, to distinguish the primarily anterior and posterior side of the colony.

Ampullæ are developed round the bases of the cyclosystems (Text-fig. 3), causing an obvious swelling of the branchlet. On these swellings the striation fades away, but the surface on the other hand here has much larger pores than elsewhere, the peripheral pores having evidently become somewhat dilated. The sex of the colonies cannot be stated with certainty, but the size of the ampullæ seems to indicate that they are females.

The ampullæ are in the present colonies always seated on the anterior side of the branchlet, and at the proximal side of the cyclosystem at the base of the lid, but never in the lid itself.

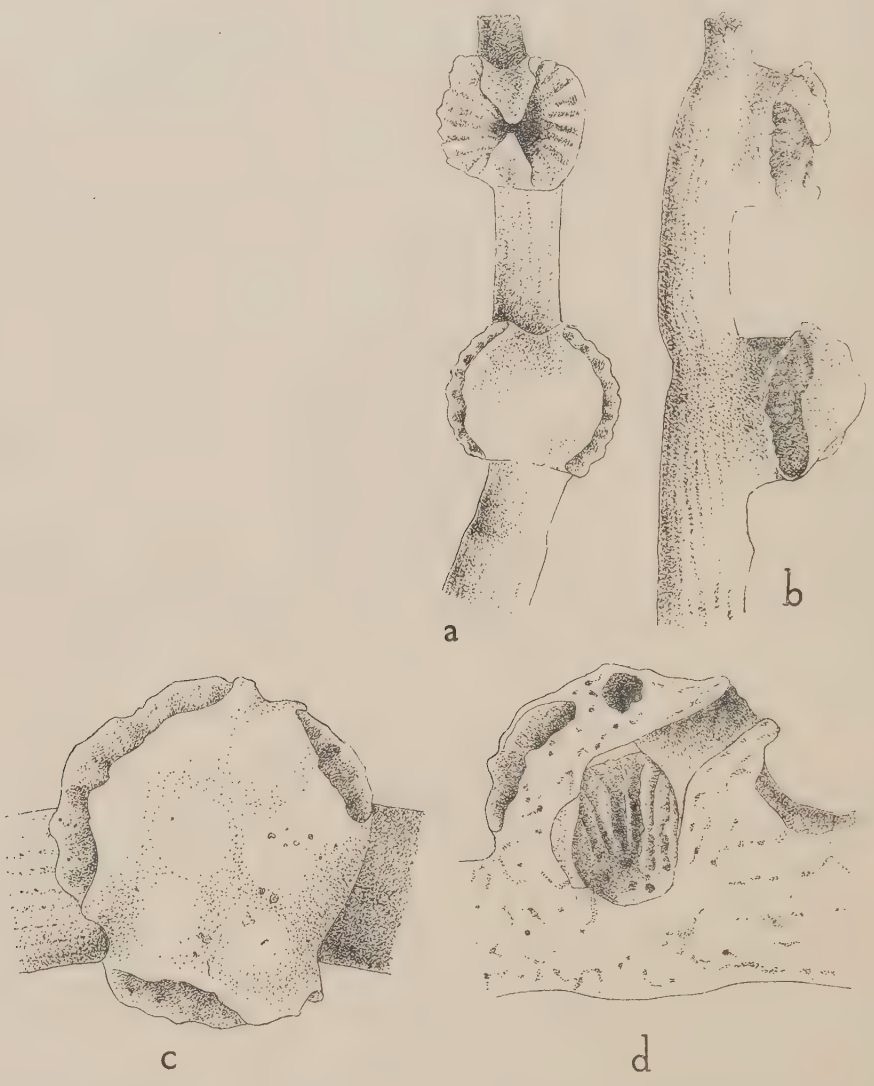
Crypthelia stenopoma had previously only been reported from two localities in the Indo-Malayan Archipelago, viz. N. of Ceram (2° 24·5′ S., 129° 38·5′ E.) and between Lucipara and Schildpad Islands in the Banda Sea (5° 26·7′ S., 127° 36·5′ E.), where it has been met with in depths between 1300 and 1633 m. The present find in only 229 m. depth (St. 157) is therefore very surprising, and it is moreover the shallowest find of the genus altogether. Also the other find in 609 to 915 m. depth is much shallower than the previous records of the species.

Crypthelia clausa n. sp.

St. 152, Maldive Islands, 609–915 m. Two colonies together with **Crypthelia stenopoma.**

The largest colony—the type specimen (Plate I, fig. 4)—is 38 mm. high and 52 mm. broad, and is intact and fixed to a small piece of dead coral. The other, somewhat smaller colony is incomplete. The colony is flabellate, with a comparatively straggling and

slightly irregularly dichotomous branching, and it has a distinct anterior side bearing all the cyclosystems, whereas the posterior side is devoid of cyclosystems. A cyclosystem is always present at the point of origin of the secondary branches on the anterior side of the fork.



Text-fig. 4.—**Crypthelia clausa** n. sp. from St. 152. Type specimen. (*a*) The two terminal cyclosystems of a branchlet in anterior view; in the utmost one the incipient formation of the lid is seen as two opposite "tongues." (*b*) The same cyclosystems in side view. (*c*) Cyclosystem with the lid fixed to the periphery of the cyclosystem by three bridges. (*d*) Section through the same cyclosystem showing ampullæ in the lid. (*a* and *b* × 9, and *c* and *d* × 12.)

The surface of the branches exhibits a rather obvious and coarse, longitudinal striation, depending on shallow furrows, in the bottom of which the radiating end canals of the meshwork debouch as small pores. Otherwise the surface is quite smooth, and no nematophores could be seen on the branches or on the lids of the cyclosystems. The calcareous substance is rather hard and snowy white in branches treated with sodium hypochlorite.

Also specimens preserved in alcohol with their soft parts intact are white or, generally, feebly yellowish.

The *cyclosystems* are remarkably large and may, in extreme cases, attain a diameter of 4 mm. ; but in most cases the diameter is between 3 and 3·5 mm. The edge of the cyclosystem is not everted (Text-fig. 4, *b*). It is in most cases impossible to count the dactylopores without demolishing the lids. In two cases, however, 18 and 22 dactylopores could be stated with certainty, the number thus evidently being somewhat larger than in **Crypthelia pudica** and **Crypthelia stenopoma.**

In fully developed cyclosystems the lid covers the cyclosystem almost entirely, like a somewhat irregularly dome-shaped roof. It is fixed to the margin of the cyclosystem in two or generally three places, exceptionally even in four, and the margin shows slight incurvations at the place of fixation when viewed from above (Text-fig. 4, *a* and *c*). The margin is not especially exsert, and not nearly so crenate in side view as in the preceding species.

The lids are as yet quite small in the youngest cyclosystems terminally on the branchlets (Text-fig. 4, *a*, *b*). It is here observed that the lid is formed from two or three (rarely four) sides of the cyclosystem, and that these separate and primarily tongue-shaped formations later on during their growth coalesce into one lid covering almost the entire cyclosystem. The lateral sides of the incipient, tongue-shaped lid formations are at first reflected somewhat upwards, but after the coalescence the lid attains a somewhat uneven convex upper surface.

In most cases the lid almost entirely covers the cyclosystem, so that the niches of the dactylozooids can only be seen along its free borders ; but in a few instances, although these cyclostems are seated on the older parts of the branches and accordingly are rather old, the lid forms only a comparatively narrow bridge over the opening, covering about one half of it. Here, as in other species of the genus, the dimensions of the lid are thus liable to great variations.

The *ampullæ* are developed in the lid, which is rather thick (Text-fig. 4, *d*). In the type colony (possibly a male) the lid contains several ampullæ. In the fragment of the other colony only one ampulla occurs in the lid. Here one cyclosystem was sacrificed for an investigation of the soft parts. As to the ampulla, it turned out that the colony was a female. The large, almost mature egg rests in a cupshaped trophodisc consisting of a large number of blind sacs.

Evidently the *gastropolyp* is devoid of tentacles. The *dactylopolyps* are rather large and finger-shaped, but without any central lumen. They are fixed to the wall of the dactylopore near the upper edge of the cyclosystem, and have a small, almost terminal adhesive part. No traces of nematophores could be detected in the sections. This is also in accordance with the external examination of the colonies, as mentioned above.

The present colonies no doubt belong to a species of **Crypthelia** which has not hitherto been recorded in the literature. The very large dimensions, especially of the cyclosystems, and the remarkably coarse build of the colonies on the whole at once attract the attention, and although the dimensions alone do not suffice as a specific criterion, they evidently support other and deciding features, such as the remarkable construction of the lid.

In all other species of **Crypthelia** that have been reported the lid is a single formation (although an anomaly was observed in one or two cases in **Crypthelia stenopoma**, where two opposite lids were found in the cyclosystem). But in **Crypthelia clausa** the lid is in

its origin normally a composite formation arising from two or three (exceptionally even four) individual lid-tongues growing out from the margin of the cyclosystem and later on coalescing into one lid. In all other previously known species of the genus the lid is only fixed to the margin of the cyclosystem by one hold.

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DESCRIPTION OF PLATE I.

Fig. 1.—*Stylaster* (*Eu-Stylaster*) *ramosus* n. sp. (*a*) Type specimen from St. 112. (*b*) Another specimen from the same station, infested by two Cirripeds (*Pyrgoma* sp.).

Fig. 2.—*Stylaster* (*Eu-Stylaster*) *lonchitis* n. sp. Type specimen, nat. size.

Fig. 3.—*Crypthelia stenopoma* Hickson and England. *a* and *b*, Two colonies seen from the anterior side. *c* and *d*, Two other colonies seen from the posterior side, nat. size.

Fig. 4.—*Crypthelia clausa* n. sp. Type specimen from the anterior side, nat. size.

a *b*

FIG. 1.

FIG. 2.

a *b* *c* *d*

FIG. 3.

FIG. 4.

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